

SJB
A3

What is claimed is:

1. An isolated nucleic acid molecule selected from the group consisting of: a nucleic acid molecule having a nucleic acid sequence that is at least about 80 percent identical to a nucleic acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:35, or a fragment thereof having at least about 12 nucleotides; a nucleic acid molecule consisting of a nucleic acid sequence selected from the group consisting of SEQ ID NO:36, SEQ ID NO:38, SEQ ID NO:39, and SEQ ID NO:40; and a nucleic acid molecule having a nucleic acid sequence that is at least about 90 percent identical to a nucleic acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:48, SEQ ID NO:49, SEQ ID NO:50, or a fragment thereof having at least about 12 nucleotides.
2. An isolated nucleic acid molecule selected from the group consisting of:
 - (a) a nucleic acid molecule having a nucleic acid sequence encoding a B7 protein selected from the group consisting of a protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:2, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:2, a protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:7, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:7, a protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:12, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:12, a protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:17, a protein comprising an epitope of said protein having an amino acid sequence that is at least

- about 60 percent identical to the amino acid sequence SEQ ID NO:17, a protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:26, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:26, a protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:34, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:34, and a protein having amino acid sequence SEQ ID NO:37;
- 10 (b) a nucleic acid molecule comprising a complement of any of said nucleic acid sequences set forth in (a);
- (c) a nucleic acid molecule having a nucleic acid sequence encoding a CTLA4 protein selected from the group consisting of: a protein having an amino acid sequence that is at least about 90 percent identical to an amino acid sequence selected from the group consisting of SEQ ID NO:42 and SEQ ID NO:47; and a protein comprising an epitope of said protein having an amino acid sequence that is at least about 90 percent identical to an amino acid sequence selected from the group consisting of SEQ ID NO:42 and SEQ ID NO:47; and
- 15 (d) a nucleic acid molecule comprising a complement of any of said nucleic acid sequences set forth in (c); wherein said B7 protein elicits an immune response against a naturally-occurring B7 protein, and wherein said CTLA4 protein elicits an immune response against a naturally-occurring CTLA4 protein.
- 20 3. An isolated nucleic acid molecule selected from the group consisting of a nucleic acid molecule that encodes a naturally-occurring soluble mammalian B7 protein and a nucleic acid molecule comprising a complement of said nucleic acid molecule that encodes said protein.
- 25 4. An isolated protein selected from the group consisting of:
- (a) an isolated protein comprising a B7 protein selected from the group consisting of a protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:2, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 80 percent identical to

- 76 -

- the amino acid sequence SEQ ID NO:2, a protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:7, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:7, a protein having an
- 5 amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:12, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:12, a protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:17, a protein comprising an
- 10 epitope of said protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:17, a protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:26, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:26, a protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:34, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:34, and a protein consisting of amino acid sequence SEQ ID NO:37, wherein said B7 protein elicits an immune response against a naturally-occurring
- 15
- 20 B7 protein; and
- (b) an isolated protein comprising a CTLA4 protein selected from the group consisting of: a protein having an amino acid sequence that is at least about 90 percent identical to an amino acid sequence selected from the group consisting of SEQ ID NO:42 and SEQ ID NO:47; and a protein comprising an epitope of said protein having an amino acid sequence that is at least about 90 percent identical to an amino acid sequence selected from the group consisting of SEQ ID NO:42 and SEQ ID NO:47;
- 25 wherein said CTLA4 protein elicits an immune response against a naturally-occurring CTLA4 protein.
5. An isolated naturally-occurring soluble mammalian B7 protein.
- 30 6. A therapeutic composition that, when administered to an animal,
- A4
regulates T cell mediated immune responses in said animal, said therapeutic composition

- S.27
ar cont
- comprising a therapeutic compound selected from the group consisting of: an isolated protein comprising a B7 protein, wherein said B7 protein is selected from the group consisting of a protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:2, a protein comprising an epitope of
- 5 said protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:2, a protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:7, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:7, a protein having an
- 10 amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:12, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:12, a protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:17, a protein comprising an
- 15 epitope of said protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:17, a protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:26, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:26, a
- 20 protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:34, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:34, a protein having amino acid sequence SEQ ID NO:37, an isolated naturally-occurring soluble B7 protein; a mimetope of any of said B7 proteins; a
- 25 multimeric form of any of said B7 proteins; an isolated protein comprising a CTLA4 protein selected from the group consisting of: a protein having an amino acid sequence that is at least about 90 percent identical to an amino acid sequence selected from the group consisting of SEQ ID NO:42 and SEQ ID NO:47; and a protein comprising an epitope of said protein having an amino acid sequence that is at least about 90 percent
- 30 identical to an amino acid sequence selected from the group consisting of SEQ ID NO:42 and SEQ ID NO:47; a mimetope of any of said CTLA4 proteins; a multimeric

*S&B
α4 card*

form of any of said CTLA4 proteins; an isolated nucleic acid molecule selected from the group consisting of: a nucleic acid molecule having a nucleic acid sequence that is at least about 80 percent identical to a nucleic acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID 5 NO:6, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:32, SEQ ID NO:33, and SEQ ID NO:35; a nucleic acid molecule consisting of a nucleic acid sequence selected from the group consisting 10 of SEQ ID NO:36, SEQ ID NO:38, SEQ ID NO:39, and SEQ ID NO:40; and a nucleic acid molecule having a nucleic acid sequence that is at least about 90 percent identical to a nucleic acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:48, SEQ ID NO:49, and SEQ ID NO:50; an isolated antibody that selectively binds to any of said B7 15 proteins; an inhibitor of B7 protein activity identified by its ability to inhibit the activity of any of said B7 proteins; an isolated antibody that selectively binds to any of said CTLA4 proteins; and an inhibitor of CTLA4 protein activity identified by its ability to inhibit the activity of any of said CTLA4 proteins.

7. A method to regulate T cell mediated immune responses in an animal 20 comprising administering to the animal a therapeutic composition comprising a therapeutic compound selected from the group consisting of: an isolated protein comprising a B7 protein, wherein said B7 protein is selected from the group consisting of a protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:2, a protein comprising an epitope of said protein 25 having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:2, a protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:7, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:7, a protein having an 30 amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:12, a protein comprising an epitope of said protein having an

- amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:12, a protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:17, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:17, a protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:26, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 60 percent identical to the amino acid sequence SEQ ID NO:26, a protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:34, a protein comprising an epitope of said protein having an amino acid sequence that is at least about 80 percent identical to the amino acid sequence SEQ ID NO:34, a protein having amino acid sequence SEQ ID NO:37, an isolated naturally-occurring soluble B7 protein; a mimotope of any of said B7 proteins; a multimeric form of any of said B7 proteins; an isolated protein comprising a CTLA4 protein selected from the group consisting of: a protein having an amino acid sequence that is at least about 90 percent identical to an amino acid sequence selected from the group consisting of SEQ ID NO:42 and SEQ ID NO:47; and a protein comprising an epitope of said protein having an amino acid sequence that is at least about 90 percent identical to an amino acid sequence selected from the group consisting of SEQ ID NO:42 and SEQ ID NO:47; a mimotope of any of said CTLA4 proteins; a multimeric form of any of said CTLA4 proteins; an isolated nucleic acid molecule selected from the group consisting of: a nucleic acid molecule having a nucleic acid sequence that is at least about 80 percent identical to a nucleic acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:32, SEQ ID NO:33, and SEQ ID NO:35; a nucleic acid molecule consisting of a nucleic acid sequence selected from the group consisting of SEQ ID NO:36, SEQ ID NO:38, SEQ ID NO:39, and SEQ ID NO:40; and a nucleic acid molecule having a nucleic acid sequence that is at least about 90 percent identical to

SJS AS

a nucleic acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:48, SEQ ID NO:49, and SEQ ID NO:50; an isolated antibody that selectively binds to any of said B7 proteins; an inhibitor of B7 protein activity identified by its ability to inhibit the activity 5 of any of said B7 proteins; an isolated antibody that selectively binds to any of said CTLA4 proteins; and an inhibitor of CTLA4 protein activity identified by its ability to inhibit the activity of any of said CTLA4 proteins.

8. A method to produce a protein selected from the group consisting of a B7 protein and a CTLA4 protein, said method comprising culturing a cell capable of expressing said protein, said protein being encoded by a nucleic acid molecule selected from the group consisting of: a nucleic acid molecule having a nucleic acid sequence that is at least about 80 percent identical to a nucleic acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:35, or a fragment thereof having at least about 18 nucleotides, wherein said fragment encodes an epitope; a nucleic acid molecule consisting of a nucleic acid sequence selected from the group 10 consisting of SEQ ID NO:36, SEQ ID NO:38, SEQ ID NO:39, and SEQ ID NO:40; a nucleic acid molecule having a nucleic acid sequence that is at least about 90 percent identical to a nucleic acid sequence selected from the group consisting of SEQ ID NO:41, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID NO:46, SEQ ID NO:48, SEQ ID NO:49, SEQ ID NO:50, or a fragment thereof having at least about 18 15 nucleotides, wherein said fragment encodes an epitope; and a nucleic acid molecule that encodes a naturally-occurring soluble mammalian B7 protein.

9. A method to identify a compound capable of regulating T cell mediated immune responses in an animal, said method comprising:

(a) contacting an isolated protein selected from the group consisting of a B7 protein and a CTLA4 protein with a putative inhibitory compound under conditions in which, in the absence of said compound, said protein has T cell stimulating activity,

wherein said B7 protein is selected from the group consisting of: a protein having an amino acid sequence that is at least about 80 percent identical to an amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:12 and SEQ ID NO:34; and a protein having an amino acid sequence that is at least about 60 percent 5 identical to an amino acid sequence selected from the group consisting of SEQ ID NO:7, SEQ ID NO:17 and SEQ ID NO:26, and wherein said CTLA4 protein is selected from the group consisting of a protein having n amino acid sequence that is at least about 90% identical to an amino acid sequence selected from the group consisting of SEQ ID NO:42 and SEQ ID NO:47; and

10 (b) determining if said putative inhibitory compound inhibits said activity.

10. The invention of Claims 1,2, or 6-8, wherein said nucleic acid molecule comprises a nucleic acid sequence that encodes a protein selected from the group consisting of a B7 protein and a CTLA4 protein.

11. The invention of Claims 1,2, or 6-8, wherein said nucleic acid molecule 15 encodes a protein that elicits an immune response against a protein selected from the group consisting of a naturally-occurring B7 protein and a naturally-occurring CTLA4 protein.

12. The invention of Claims 1,2, or 6-8, wherein said nucleic acid molecule is selected from the group consisting of: a nucleic acid molecule comprising a nucleic acid 20 molecule selected from the group consisting of nCaB7-1₂₈₃₀, nCaB7-1₁₃₈₅, nCaB7-1₉₁₂, nCaB7-2₁₈₉₇, nCaB7-2₉₈₇, nCaB7-1s₁₀₂₄, nCaB7-1s₇₀₅, nCaB7-2s₁₇₉₅, nCaB7-2s₈₄₀, nFeB7-2₂₈₃₀, nFeB7-2₉₉₆, nCaB7-1s₈₁₀, nCaB7-2₉₂₁, nCaB7-1s₆₀₃, nCaB7-2s₇₇₄, nFeB7-2₉₁₈, nFeB7-2s₅₀₉, nFeB7-2s₃₅₉, nCaCTLA4₁₈₅₆, nCaCTLA4₆₇₂, nFeCTLA4₁₈₈₃, and nFeCTLA4₆₇₂; and a nucleic acid molecule consisting of a nucleic acid molecule selected 25 from the group consisting of nFeB7-1s₅₉₄ and nFeB7-1s₅₁₉.

13. The invention of Claims 1,2, or 6-8, wherein said nucleic acid molecule is selected from the group consisting of: a nucleic acid molecule comprising a nucleic acid sequence that encodes a protein having an amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:7, SEQ ID NO:12, SEQ ID NO:17, SEQ ID 30 NO:26, SEQ ID NO:31, SEQ ID NO:34, SEQ ID NO:42, and SEQ ID NO:47; a nucleic acid molecule comprising an allelic variant of a nucleic acid molecule encoding a protein

*SUB
AC cond'l*

having an amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:7, SEQ ID NO:12, SEQ ID NO:17, SEQ ID NO:26, SEQ ID NO:31, SEQ ID NO:34, SEQ ID NO:42, and SEQ ID NO:47; a nucleic acid molecule consisting of a nucleic acid sequence that encodes a protein having amino acid sequence SEQ ID 5 NO:37; and a nucleic acid molecule consisting of an allelic variant of a nucleic acid molecule that encodes a protein having amino acid sequence SEQ ID NO:37.

14. The invention of Claims 1,2, or 6-8, wherein said nucleic acid molecule is selected from the group consisting of: a nucleic acid molecule comprising a nucleic acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:3, SEQ ID 10 NO:4, SEQ ID NO:5, SEQ ID NO:6, SEQ ID NO:8, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:14, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:18, SEQ ID NO:19, SEQ ID NO:20, SEQ ID NO:25, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:29, SEQ ID NO:30, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:35, SEQ ID NO:41, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:45, SEQ ID 15 NO:46, SEQ ID NO:48, SEQ ID NO:49, and SEQ ID NO:50; and a nucleic acid molecule comprising an allelic variant of a nucleic acid molecule comprising any of said nucleic acid sequences.

15. The invention of Claims 1-3 or 6-8, wherein said nucleic acid molecule is selected from the group consisting of: a nucleic acid molecule consisting of a nucleic acid sequence selected from the group consisting of SEQ ID NO:36, SEQ ID NO:38, SEQ ID NO:39, and SEQ ID NO:40. and a nucleic acid molecule consisting of an allelic variant of a nucleic acid molecule consisting of any of said nucleic acid sequences.

*SUB
A7*

16. The invention of Claims 1-3 or 6-8, wherein said nucleic acid molecule comprises an oligonucleotide.

25 17. A recombinant molecule comprising a nucleic acid molecule as set forth in Claims 1-3 or 6-8, operatively linked to a transcription control sequence.

18. A recombinant virus comprising a nucleic acid molecule as set forth in Claims 1-3 or 6-8.

19. A recombinant cell comprising a nucleic acid molecule as set forth in 30 Claims 1-3 or 6-8.

20. The nucleic acid molecule of Claim 3, wherein said naturally-occurring soluble mammalian B7 protein is selected from the group consisting of a naturally-occurring soluble mammalian B7-1 protein and a naturally-occurring soluble mammalian B7-2 protein.

Sch 52 | 21. The nucleic acid molecule of Claim 3, wherein said nucleic acid molecule comprises a nucleic acid sequence encoding a naturally-occurring soluble B7-2 protein having extracellular and intracellular domains but lacking at least a portion of a transmembrane domain sufficient to produce a soluble protein upon translation of said nucleic acid molecule in a suitable host cell.

10 | 22. The nucleic acid molecule of Claim 3, wherein said nucleic acid molecule comprises a nucleic acid sequence encoding a naturally-occurring soluble B7-1 protein having an extracellular domain but lacking at least a portion of transmembrane and intracellular domains sufficient to produce a soluble protein upon translation of said nucleic acid molecule in a suitable host cell.

Sch 15 AG | 23. The nucleic acid molecule of Claim 3, wherein said naturally-occurring soluble mammalian B7 protein is capable of binding to a protein selected from the group consisting of CD28 and CTLA4.

20 | 24. The nucleic acid molecule of Claim 3, wherein said nucleic acid molecule comprises a nucleic acid sequence encoding a naturally-occurring soluble feline B7-1 protein having an extracellular domain but lacking at least a portion of transmembrane and intracellular domains sufficient to produce a soluble protein upon translation of said nucleic acid molecule in a suitable host cell, wherein said extracellular domain comprises an IgV-like domain, but lacks an IgC-like domain.

Sch 10 AG 25 | 25. The nucleic acid molecule of Claim 3, wherein said naturally-occurring soluble mammalian B7 protein is capable of delivering a co-stimulatory signal to a helper T cell sufficient to stimulate cytokine secretion by said helper T cell.

26. The nucleic acid molecule of Claim 1-3 or 6-8, wherein said nucleic acid molecule is selected from the group consisting of a canine nucleic acid molecule and a feline nucleic acid molecule.

*SUB
G10 coid*

27. The invention of Claims 4 or 6-9, wherein said protein, when administered to an animal, elicits an immune response against a protein selected from the group consisting of a B7-1 protein, a B7-2 protein and a CTLA4 protein.

28. The invention of Claims 4 or 6-9, wherein said protein is selected from the group consisting of: a protein comprising an amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:7, SEQ ID NO:12, SEQ ID NO:17, SEQ ID NO:26, SEQ ID NO:31, SEQ ID NO:34, SEQ ID NO:42, and SEQ ID NO:47; a protein encoded by an allelic variant of a nucleic acid molecule encoding a protein selected from the group consisting of SEQ ID NO:2, SEQ ID NO:7, SEQ ID NO:12, SEQ ID NO:17, SEQ ID NO:26, SEQ ID NO:31, SEQ ID NO:34, SEQ ID NO:42, and SEQ ID NO:47; a protein consisting of amino acid sequence SEQ ID NO:37; and a protein encoded by an allelic variant of a nucleic acid molecule encoding a protein consisting of amino acid sequence SEQ ID NO:37.

29. An isolated antibody that selectively binds to a protein as set forth in Claims 4-9.

30. The protein of Claim 5, wherein said protein is selected from the group consisting of a naturally-occurring soluble mammalian B7-1 protein and a naturally-occurring soluble mammalian B7-2 protein.

31. The protein of Claim 4-9, wherein said protein is selected from the group consisting of a canine protein and a feline protein.

32. The protein of Claim 5, wherein said protein comprises an isolated naturally-occurring soluble B7-2 protein comprising extracellular and intracellular domains but lacking at least a portion of a transmembrane domain sufficient to be a soluble B7-2 protein.

33. The protein of Claim 5, wherein said protein comprises an isolated naturally-occurring soluble B7-1 protein comprising an extracellular domain but lacking at least a portion of transmembrane and intracellular domains sufficient to produce a soluble B7-1 protein.

34. The protein of Claim 5, wherein said protein comprises a naturally-occurring soluble feline B7-1 protein having an extracellular domain but lacking at least a portion of transmembrane and intracellular domains sufficient to produce a soluble

protein upon translation of said nucleic acid molecule in a suitable host cell, wherein
said extracellular domain comprises an IgV-like domain, but lacks an IgC-like domain.

35. The protein of Claim 5, wherein said protein is capable of binding to a
protein selected from the group consisting of CD28 and CTLA4.

5 36. The protein of Claim 5, wherein said protein is capable of delivering a co-
stimulatory signal to a helper T cell sufficient to stimulate cytokine secretion by said
helper T cell.

5/11 | 10 37. The invention of Claim 6 or Claim 7, wherein said composition further
comprises a component selected from the group consisting of an excipient, an adjuvant
and a carrier.

38. The invention of Claim 6 or Claim 7, wherein said therapeutic compound
is selected from the group consisting of a naked nucleic acid vaccine and a recombinant
cell vaccine.

39. The method of Claim 7, wherein said animal is selected from the group
15 consisting of canines and felines.

added
B